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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,487	08/30/2001	Eugene H. Cloud	4296.1US (00-0054.1)	2698

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EXAMINER

FARAHANI, DANA

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

09/944,487

Applicant(s)

CLOUD ET AL.

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☒ Claim(s) 8, 9, and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4-7, 10, 14-18, 20-24, 26-29, and 33, 34, 36-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Buckley, III et al., hereinafter Buckley (U.S. 5,477,082).

Regarding claims 1, 2, and 4-7, Buckley discloses in figure 6 a method for interconnecting at least two semiconductor dice, 56 and 58A, comprising: providing a first semiconductor die 56, including a plurality of bond pads beneath the die, arranged in an array over an active surface thereof; providing at least one second semiconductor die 58A including a plurality of bond pads on an active surface thereof; orienting said first semiconductor die and said at least one second semiconductor die with said active surfaces thereof facing each other; electrically connecting at least some bond pads of said plurality of bond pads of said at least one second semiconductor die with corresponding bond pads of said first semiconductor die via laterally discrete, physically unconnected conductive structures (note in the figure that the egg shaped connection structures are connected through conductors 24A of figure 3).

Regarding claims 14, 18, 20-22, 33, 34, and 36-38, there is a carrier 60 with a plurality of contacts; wherein the active surface of the first semiconductor die faces the carrier, and the other bond pads of the first die is connected to contacts of the carrier.

Regarding claims 10 and 29, see column 6, lines 16-19.

Regarding claims 23-24 and 39, disclosed in figure 6 is a method for packaging a semiconductor device assembly, comprising: providing a first semiconductor die 56 including a plurality of bond pads arranged in an array over an active surface thereof; providing at least one second semiconductor die 58A including a plurality of bond pads arranged on an active surface thereof; orienting said at least one second semiconductor die over said first semiconductor die with said active surface facing said active surface of said first semiconductor die, said plurality of bond pads of said at least one second semiconductor die in alignment with corresponding bond pads of said first semiconductor die; providing a carrier 60 with a plurality of contacts; and orienting said first semiconductor die over said carrier with said active surface facing said carrier, bond pads of said first semiconductor die exposed beyond an outer periphery of said at least one second semiconductor die in alignment with corresponding contacts of said carrier.

Regarding claims 26-28, see column 3, lines 46-47.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 11-13, 30-32, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley.

Regarding claim 3, it would have been within the level of ordinary skill in the art to use the second chip as a memory device.

Regarding claims 13 and 32, Buckley discloses the claimed invention except leads corresponding to the bond pads. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the leads in order to make external connections to the pads.

Regarding claim 40, Buckley discloses in figure 6 a first semiconductor die 56 and a second semiconductor die 90 where the bond pad of the second die is connected to the corresponding bond pad of the first die.

Buckley does not disclose plurality of bond pads of the dice are connected to each other. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more connections to further connect the two chips.

Buckley does not expressly disclose another first and second dies with plurality of bond pads. However, Buckley discloses in figure 6 plurality of chips 56, 58A, and 90. It would have been within the level of ordinary skill in the art at the time the invention was made to include as many chips as desired, according to the particular application in which Buckley's innovative connection method to be used.

5. Claims 11, 12, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley as applied to claims 10 and 29 above, and further in view of Maurinus (U.S. 5,302,778).

Buckley discloses the claimed invention except the second chip being disposed in a recess in the chip carrier. Maurinus discloses in column 1, lines 15-25, connecting a substrate with a die via a recess forms a more compact structure. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use recess in the substrate carrier in order to form a more compact structure.

6. Claims 19 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley as applied to claims 18 and 35 above, and further in view of Hsuan et al., hereinafter Hsuan (U.S. Patent 6,239,366), newly cited.

Buckley discloses the limitations in claims 19 and 35, as above discussed, except for directly connecting the conductive element.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the conductive elements directly to each other, since it was known in the art that conventional connective structure of two semiconductor chips are directly connected to each other (see Hsuan, figure 3A, wherein pads 68 are connected to each other via directly connective conductive elements 70).

Allowable Subject Matter

7. Claims 8, 9, and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for indication of allowability of claims 8 and 9 is applicant's argument that there are other bond pads, which remain exposed beyond an outer periphery of at least one second semiconductor die. This limitation is not disclosed, nor thought in the prior art of record.

Response to Arguments

9. Applicant's arguments filed on 8/26/02 have been fully considered but they are not persuasive.

Regarding applicant's argument that "amended claim 1 recited that the conductive structures are laterally discrete and physically unconnected from each other" note that as pointed out in above rejection of claim 1, this requirement is disclosed in Buckley.

Regarding applicant argument that Buckley fails to teach providing conductive structures between each of a plurality of bond pads of the at least one second semiconductor die and corresponding bond pads of the first semiconductor die, note

that in figure 6 the bond pads of die 56 are clearly connected to corresponding bond pads of die 58A.

Regarding applicant's argument that Buckley's conductive elements are not directly connected to each other, note that this limitation is rendered obvious in view of newly cited reference, Hsuan.

It is believed now that all arguments made by applicant is considered and responded to.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani
October 26, 2002

A handwritten signature in black ink, appearing to read 'Long Pham', with a stylized, cursive script.

LONG PHAM
PRIMARY EXAMINER